520E Series

Fiber Optic
8/16 Channel RS-422/RS-232 Data
Transmission System

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SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AS OUR PRODUCTS CONTAIN

CLASS I LASER PRODUCTS

WARNING

Do not disconnect the fiber optic connector while the unit is powered up. Exposure to laser radiation is possible when the laser fiber optic connector is disconnected while the unit is powered up.

Although the fiber optic connectors in this product emit only Class 1 energy that is below the levels considered to be hazardous, one should never stare directly into a fiber optic connector or an unconnected fiber end unless one can be certain that no exposure to laser energy could occur.

CAUTION

This manual is intended for use by trained service personnel. The use of controls, making adjustments, or performing operations other than those specified may result in hazardous radiation exposure.

The following label or equivalent is located on the surface of laser products. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.

SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

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1.0 PRODUCT DESCRIPTION

The BCI 520E Series is a low-cost, high performance Digital Fiber Optic Multiple RS-232 or RS-422 Channel Data Transmission System, providing simultaneous transmission of multiple serial data channels, and offering a high channel density solution for low-bandwidth applications.

The standard 520E system is designed to transport sixteen asynchronous RS-232 data channels, or eight asynchronous RS-422 data channels, over long distances with a single or pair of singlemode or multimode fiber. Data rates for the 520E are up to 128 kbps for each RS-232 channel, or up to 750 kbps to 1 Mbps for each RS-422 channel. Lastly, the 520E's can be configured for various distances depending on the application.

The 520E provides front panel LED indicators for power and optical link status.

The 520E is available in a standalone or card cage format, thereby accommodating multiple configurations, depending on the application.

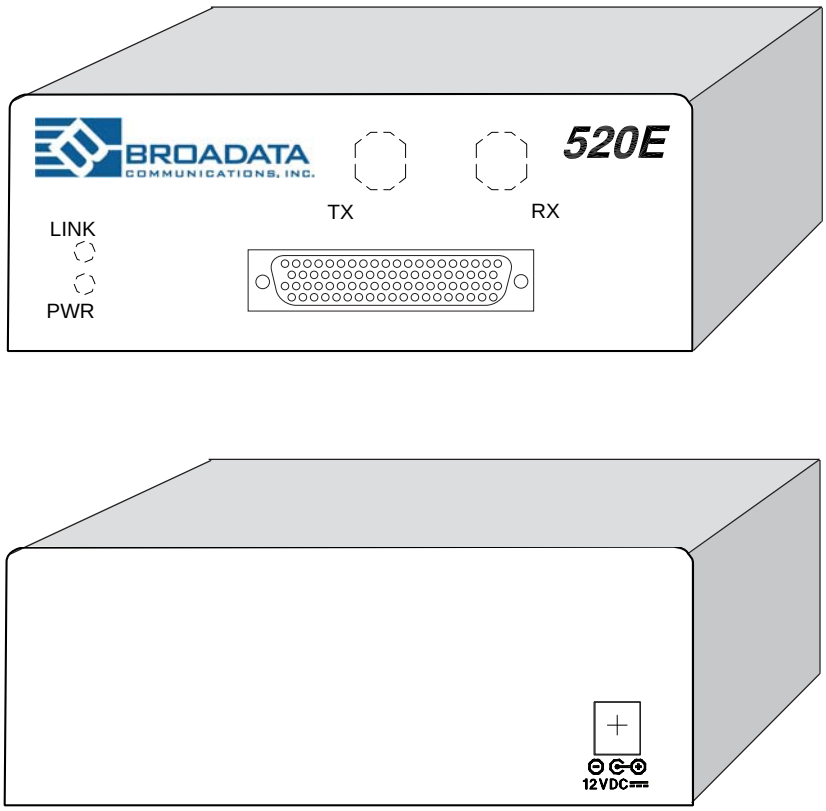

Figure 1-1
520E Front/Rear Panels

2.0 SETUP

The BCI 520E Series units are used in pairs. One 520E transceiver unit is located at the near end and connected through two optical fibers to an identical 520E transceiver located at the far end of the link. Each unit provides an electrical interface connector for the RS-232 or RS-422 data signals. Connections are one to one between both units. Figure 2-1 depicts a typical installation.

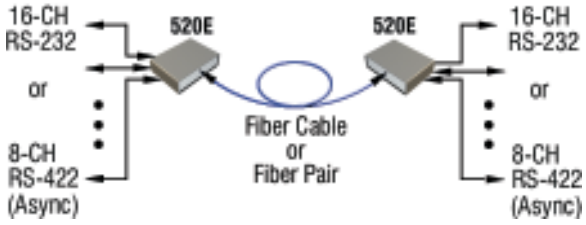

Figure 2-1
520E Setup

2.1 Mounting

Before installing the units into your housing, make sure there is enough space to pull and connect both the electrical and optical cables without stressing them beyond the manufacturer's limitations (also known as the bend radius minimum). Rack mount kits are available for half-size versions only, with internal power supplies.

2.2 Cabling and Connectors

In order to setup the BCI 520E properly, make sure to observe the following instructions when installing the proper cables. The 520E requires two parts to the cabling setup: the electrical and the optical.

2.3 Electrical Cable Connection

The only available cable connections on the electrical side is for the RS-232 or RS-422 connections.

2.3.1 Data Channel Connection

Use the following steps to connect to your data equipment.

1. Before connecting your user supplied equipment, wire up the proper cabling to connect from the 520E to the end-user's equipment, observing Table 2-1 pinouts for the various RS-232 or RS-422 applications. Note: The 520E units require a cable with a 78-pin interface in order to convert the pinouts over to their respective RS-232 or RS-422 equivalent. The pinouts for the 78-pin connector is illustrated in Figure 2-2.
2. At the local end, connect one end of a serial computer data cable to the user's data device and the other end to the 520E unit's 78-pin connection. Repeat this step for each RS-232 or RS-422 channel.
3. Repeat steps 1 and 2 for the far end observing the pinouts for the 78-pin with their respective connector.
4. The following parts and tools are used for this 78-pin connector.
    a. D-Sub 78-pin, Mfg. P/N 180-078-172-000 or BCI P/N 30304-0878.
    b. Male Crimp pin, Mfg. P/N 180-001-170-001 or BCI P/N 30060-0085.
    c. Crimp tool from Paldin 1600 Series.
    d. Metalized backshell for DB 78-pin, Mfg. P/N 979-050-020-121 or BCI P/N 30060-0979.
    e. D-Sub 78-pin with solder cup pins, Mfg. P/N 180-078-102-011 or BCI P/N 30060-4878.

Connection	RS232 Pinouts	RS422/485 Pinouts
Channel 1	2-Rx, 3- Tx	3-Tx+, 42-Tx-, 2-Rx+, 41-Rx-
Channel 2	4-Rx, 5- Tx	5-Tx+, 44-Tx-, 4Rx+, 43-Rx-
Channel 3	6-Rx, 7- Tx	7-Tx+, 46-Tx-, 6-Rx+, 45-Rx-
Channel 4	8-Rx, 9- Tx	9-Tx+, 48-Tx-, 8-Rx+, 47-Rx-
Channel 5	22-Rx, 23- Tx	23-Tx+, 62-Tx-, 22-Rx+, 61-Rx-
Channel 6	24-Rx, 25- Tx	25-Tx+, 64-Tx-, 24-Rx+, 63-Rx-
Channel 7	26-Rx, 27- Tx	27-Tx+, 66-Tx-, 26-Rx+, 65-Rx-
Channel 8	28-Rx, 29- Tx	29-Tx+, 68-Tx-, 28-Rx+, 67-Rx-
Channel 9	12-Rx, 13- Tx	
Channel 10	14-Rx, 15- Tx	
Channel 11	16-Rx, 17- Tx	
Channel 12	18-Rx, 19- Tx	
Channel 13	31-Rx, 32- Tx	
Channel 14	33-Rx, 34- Tx	
Channel 15	35-Rx, 36- Tx	
Channel 16	37-Rx, 38- Tx	
Ground	1, 10, 11, 20, 21, 30, 39, 40, 49, 50, 59, 60, 69, 78	1, 10, 11, 20, 21, 30, 39, 40, 49, 50, 59, 60, 69, 78
Note:	RX = Input signal to 520E Series data port TX = Output signal from 520E Series data port GND = Connections same for RS-232 and RS-422/485	

Table 2-1
Electrical Pinouts
For 78-pin Connector (Side A)

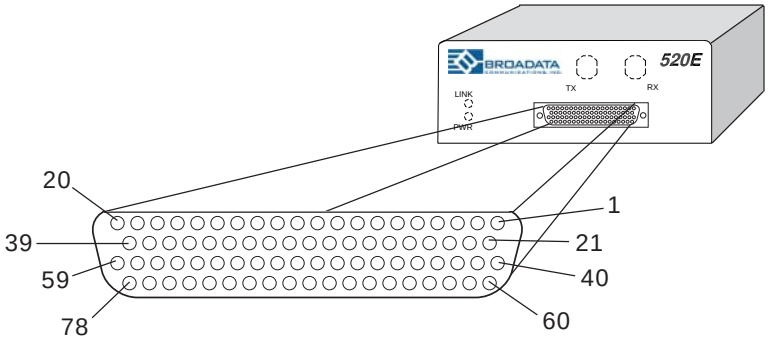

Figure 2-2
Two 78-Pin Connector Legend

2.3.2 Optical Fiber Connection

Most cable manufacturers identify individual fibers in the fiber cable. Select an appropriate terminated fiber. Each unit's optical ports in the system are specified for use with Multimode (62.5/125 micron) fiber, or Singlemode (9/125 micron) fiber. Follow the ensuing instructions on installing and connecting the fiber optic links:

1. Ensure the power is off before proceeding with the fiber optic cable installation.
2. Prior to connecting the fiber optic cables, remove and save the dust caps from the optical port of both the 520E units. Clean the fiber optic connector and use a lint-free cloth dampened with alcohol to thoroughly wipe the side and end of the ferrule. Use Table 2-2 as a guideline when connecting ST and FC connectors.
3. Cross-connect the fibers from one unit to the other, connecting the near end 520E unit's optical TX port to the far end 520E unit's optical RX port, as illustrated in Figure 2-3. Observe the type of connector you have

and connect the optical connector by following the instructions and guidelines from the legend provided below, in Table 2-2.

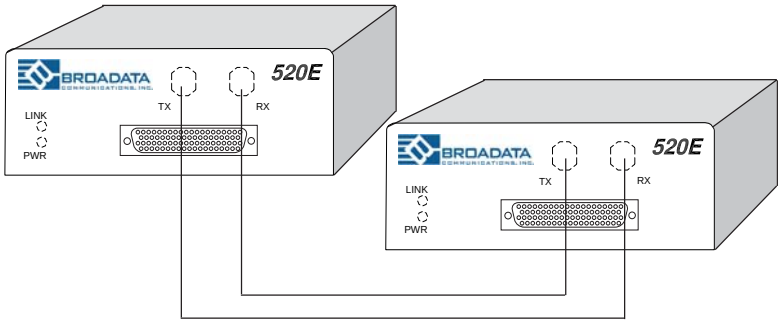

Figure 2-3
Fiber Optic Connection

Connector	Illustration	Description
ST	ST Connector	Hold the connector by the strain-relief boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward until it can be turned clockwise to latch to the port.
FC	FC Connector	Hold the connector by the strain-relief boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward and screw clockwise until it is tight.

Table 2-1
Fiber Optic Connector Legend

2.4 DC Power Connection

Congratulations! You are now ready to power up the BCI 520E and set up your network connection. In order to make sure that you have a proper installation, please observe the following:

1. Your AC jack has power.
2. The 12VDC power supply is working.
3. Your electrical system has proper grounding (this ensures that your power supply does not suffer from voltage variations).
4. **Power Surge Protection. This is optional**, but highly recommended. A UPS system provides voltage regularity as well as prevents spikes from occurring, thus protecting your 520E from sensitive voltage conditions.

The 520E derives power from an external 12VDC power supply. This power supply is a wall-mounted AC/DC adapter, 100-240 VAC, 50-60 Hz, @1 A. This power supply comes standard for the 520E Series unless otherwise specified.

To provide power to the 520E, simply connect the power supply, already provided with the units, and connect it to the wall jack. (You will find one power supply per unit). Once the power supply has been connected to the wall jack, connect the 12VDC to the unit and the unit should power up immediately.

If you have any problems or concerns, regarding the installation, make sure that you have taken the proper steps to ensure a proper power connection. Otherwise, feel free to contact us for any questions you may have.

3.0 OPERATION

After the installation procedure is completed, the units are ready for operation. To operate the BCI 520E units, simply apply power as indicated in the previous step. Note that the front panel link status indicator, shown in Section 4.1, Table 4-1, will be activated.

4.0 MAINTENANCE AND TROUBLESHOOTING

4.1 Maintenance

There is no operator maintenance other then keeping the units clean. However, observe the following light indicators to make sure that the unit is working properly:

Power	This RED LED indicates that the 520E transceiver (TRX) unit is connected to a power source.
Link	The ON state of this GREEN LED on the 520E unit indicates that the fiber link is active and working.

Table 4-1
Status Indicators

4.2 Troubleshooting

If the BCI 520E units do not operate properly after installation, check for possible cable breaks, loose connections, and incorrect cable connections. If a problem exists on the fiber link, please check your fiber connectors for improperly cleaned fiber cables and connectors. If problems persist that may be fiber related, contact BCI at 1-800-214-0222 for further assistance.

For electrical problems, perform the following troubleshooting procedures:

1. **If the POWER indicator is OFF, check for the following:**

   a. The line cord is plugged into the unit and your outlet has power.

   b. The 520E unit is powered on.

2. **If the POWER indicator is ON, but the Optical Link indicator is OFF, check for the following:**

   a. Make sure the appropriate (Singlemode or Multimode) fibers are being used.

   b. Fiber and fiber connectors are not broken. Ensure that the optical loss does not exceed the specified optical power attenuation (see Section 5.0 Specifications for the optical power budget).

   c. For each unit, the transmit (TX) fiber is connected to the other unit's receiver (RX).

3. If the POWER indicator and Optical Link indicator are ON, but the data channels are not operating, then:

a. Check to see that the attached user equipment is turned on.

b. Both ends of the link are connected to the corresponding equipment and to the same corresponding channel port.

c. Cable connections at both the data channels are securely fastened to each connector. Turn the power off, then back on to reset the link.

d. Output levels of the user's data sources are not above the allowed input levels of the 520E units (see Section 5.0 Specifications).

5.0 SPECIFICATIONS

Electrical

Channel Number	16 (RS-232) or 8 (RS-422)
Signal Format	RS-232 or RS-422
Interface	DCE
Data Rate	Up to 128 Kbps (RS-232) Up to 1 Mbps (RS-422)
Bit Error Rate	$< 10^{-9}$
Connector	DB-78

Physical

Dimension: (H x W x D)	
Standalone unit	1.72" x 4.36" x 6.9"
Card-cage plug-in card	5.24" x 0.94" x 11.6"
Power Level	+12VDC @ 1A
Power Connector	2.5mm Jack
Operating Temperature	0 to +50°C (extended range is also available)
Humidity	0 to 95% RH, non-condensing
Status Indicators	Power, Optical Link, Data Activity

Optical

Fiber Type	Multimode and Singlemode
Number of Fibers	2 or 1
Wavelength	1310 and/or 1550 nm
Fiber Optic Connector	ST (Multimode) FC (Singlemode)

Optical (continued)

Typical Power Budget and Transmission Distance

Application	Power Budget (1)	Typical Distance KM (2)	Typical Distance Miles (2)
Multimode Fiber	12	2	1.2
Singlemode Fiber	16	40	25
Singlemode Long Distance	16	60	37.5

(1) These are typical values for the 520E Series. The actual values may vary.

(2) These are typical distance coverage figures. The maximum distance coverage may be greater than these typical numbers, depending on fiber type, fiber bandwidth, connector splicing losses, chromatic dispersion, environmental factors, etc.

6.0 SERVICE PROCEDURE

6.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at **800-214-0222** for information.

6.2 Return/Repair Service

The 520E System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product model number
- Serial Number
- Complete description of problem
- Hardware installation description

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

7.0 LIMITED WARRANTY

Broadata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

Notes

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Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

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